

found that the ring disappears at the same time all round, whereas if the white spot had any real existence (*i.e.* if it were really brighter than the other parts of the ring), it would have remained visible after the other portions of the ring had been cut out by the dark wedge. The appearance of increase of brightness can be produced with either the 6-inch refractor or the 5-foot reflector, on any part of the planet, at any time, by allowing it to pass partly out of the field when all parts of the ball and ring in immediate contact with the edge appear sensibly brighter than the rest of the planet. At the Lick Observatory, with an occulting bar on the 36-inch refractor, a similar effect was noticed at the edges of the bar.

The contrast appearance which is seen near the shadow of the planet on the ring is sometimes more obvious than at others, but atmospheric irregularities will explain much of this suspected variability. It is remarkable that such careful observers as Bond and others who have worked on *Saturn* should not have called attention to this appearance before, but it will probably be found much more prominent in certain positions of the planet and rings than in others.

The powers used have varied considerably; 300 has been generally used on the 6-inch, and as much as 1400 on the 5-foot. With the latter power the shadow has a decidedly notched appearance, the outer and brighter part of the middle ring (B) projecting farther into the shadow than any other part of the ring, although the outer ring (A) is closer to the planet than one would expect from the outline of the shadow on the inner portions of the ring. It may be that this notched appearance, which is only distinctly visible with very high powers, may have some connection with the appearance to which Dr. Terby directed attention, but the observations made at Ealing very decidedly point to the explanation of the supposed white region as an effect of contrast.

Saturn was photographed several times with the 5-foot in April. Although definition in the photographs is not good, the shadow can easily be made out by the absence of silver particles, but there are not the slightest indications of any bright spot on the rings near the shadow.

Photograph of the Nebula M 51 Canum Venaticorum.

By Isaac Roberts.

The photograph which is now presented is an enlargement to ten times the negative of M 51 *Canum Venaticorum*, R.A. $13^{\text{h}} 25^{\text{m}}$, D. $+47^{\circ} 45'$. The negative was taken on April 28, 1889, with an exposure of four hours, and it adds considerably to our knowledge of the structure and the surroundings in space of this

nebula, and I think that it will be generally accepted as a demonstration of the truth of the nebular or of the meteoric hypothesis.

The nebula is well known by the numerous drawings and descriptions of it, particularly those by Herschel, Rosse, and Lassell.

The drawing by Lassell* agrees well in general outline with the photograph, and I must bear testimony to the fact that Lassell's drawings of other nebulae also generally agree more closely with the photographs than do those of any other delineator that have come under my notice. But all drawings alike fail to present to the eye proportions, details, and outlines as they are shown on the photographs.

Referring now to the photograph before us, we see much more than the spiral form of a nebula with apparently two distant nuclei, for we see that the spirals have broken up at relatively short intervals into stars which are either coincident with, or very closely follow, all the convolutions of the spiral. The coincidence of the stars with the trend of the spiral from the nucleus to the farthest whorls of the nebulous stream is remarkable, and the condensation of the nebulous, or shall we say agglomeration of the meteoric matter into stars, is so striking that we feel deeply impressed by the singularity of the appearance, which to me is inexplicable by any hypothesis of fortuitous coincidence. If the evidence of condensation into stars rested alone upon that shown in this photograph it would be almost irresistible, but when we turn to re-examine and compare the photographs of M 81 *Ursae Majoris* and M 31 *Andromedæ*, which have been presented to the Society, we find corroborative evidence that amounts, I submit, to a demonstration that we now see in various stages of progress the evolution of stellar systems corresponding with our ideas of the early state of the solar system.

The photograph is placed in the Library.

* *Mem. R.A.S.*, vol. xxxvi. pl. 6, fig. 27.